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Wurthner

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[54] **SPORTS EQUIPMENT OR VEHICLES WITH RUNNERS WITH INTERCHANGEABLE BLADE**

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PCT Pub. Date: **Apr. 28, 1994**

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[51] **Int. Cl.**[6] **A63C 1/32**

[52] **U.S. Cl.** **280/11.18**; 280/11.12

[58] **Field of Search** 280/11.18, 11.16, 280/841, 825, 11.12, 7.13

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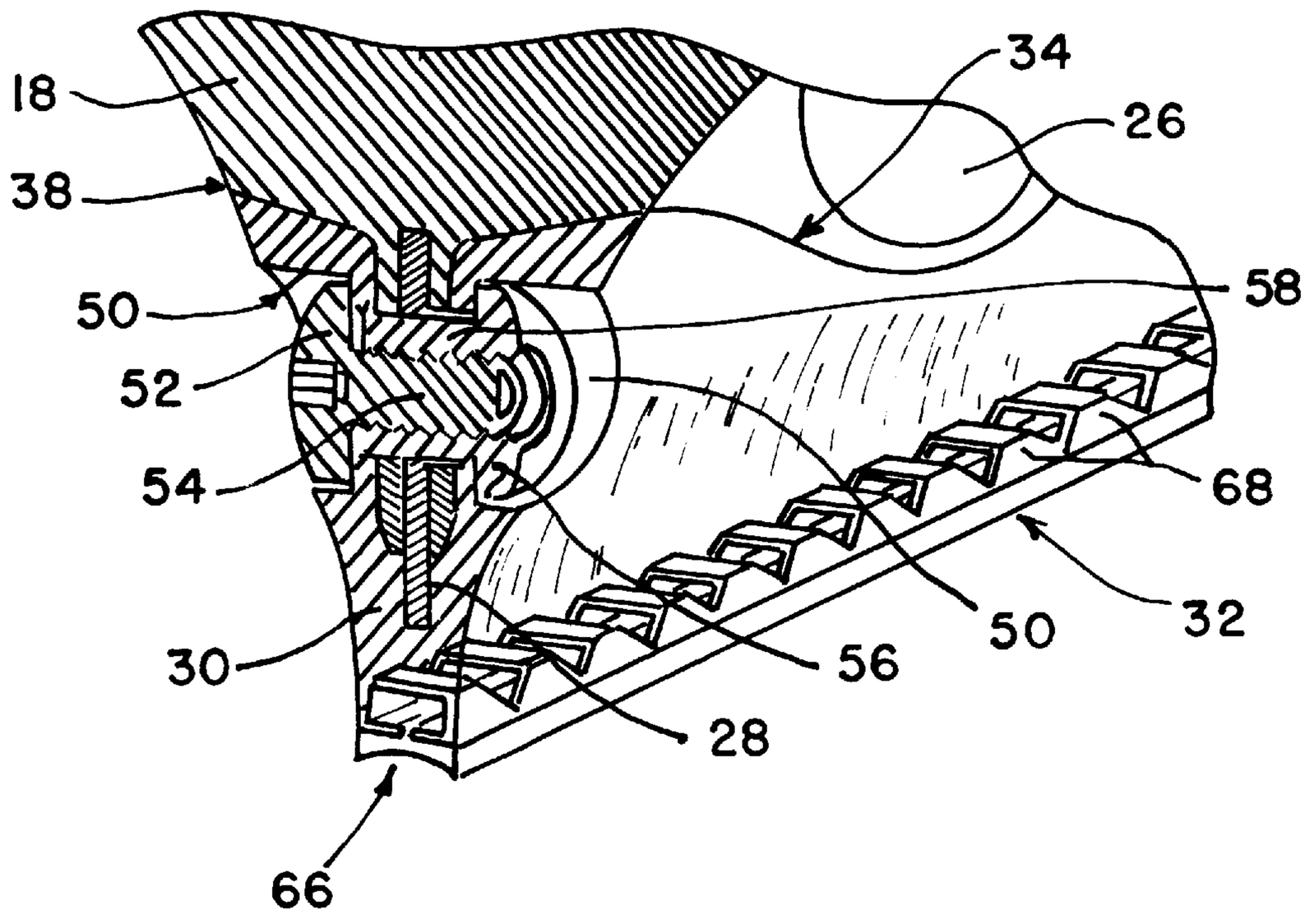
Primary Examiner—Anne Marie Boehler

Attorney, Agent, or Firm—Gary M. Nath; Nath & Associates; Harold Novick

[57] **ABSTRACT**

A skating appliance or vehicle having a skate with a plastic base and a composite running blade exchangeably secured thereto. The exchangeable composite running blade is secured with the high resistance to torsion and flexure as well as high security against fracture, by means of an on edge mounted profiled stabilizing rail set into the lower side of the base, and easy to handle screwable holding members, and a corresponding design of the individual parts. These elements allow an arrangement to be obtained which as a whole has a low weight and a high resistance to pressure.

23 Claims, 10 Drawing Sheets



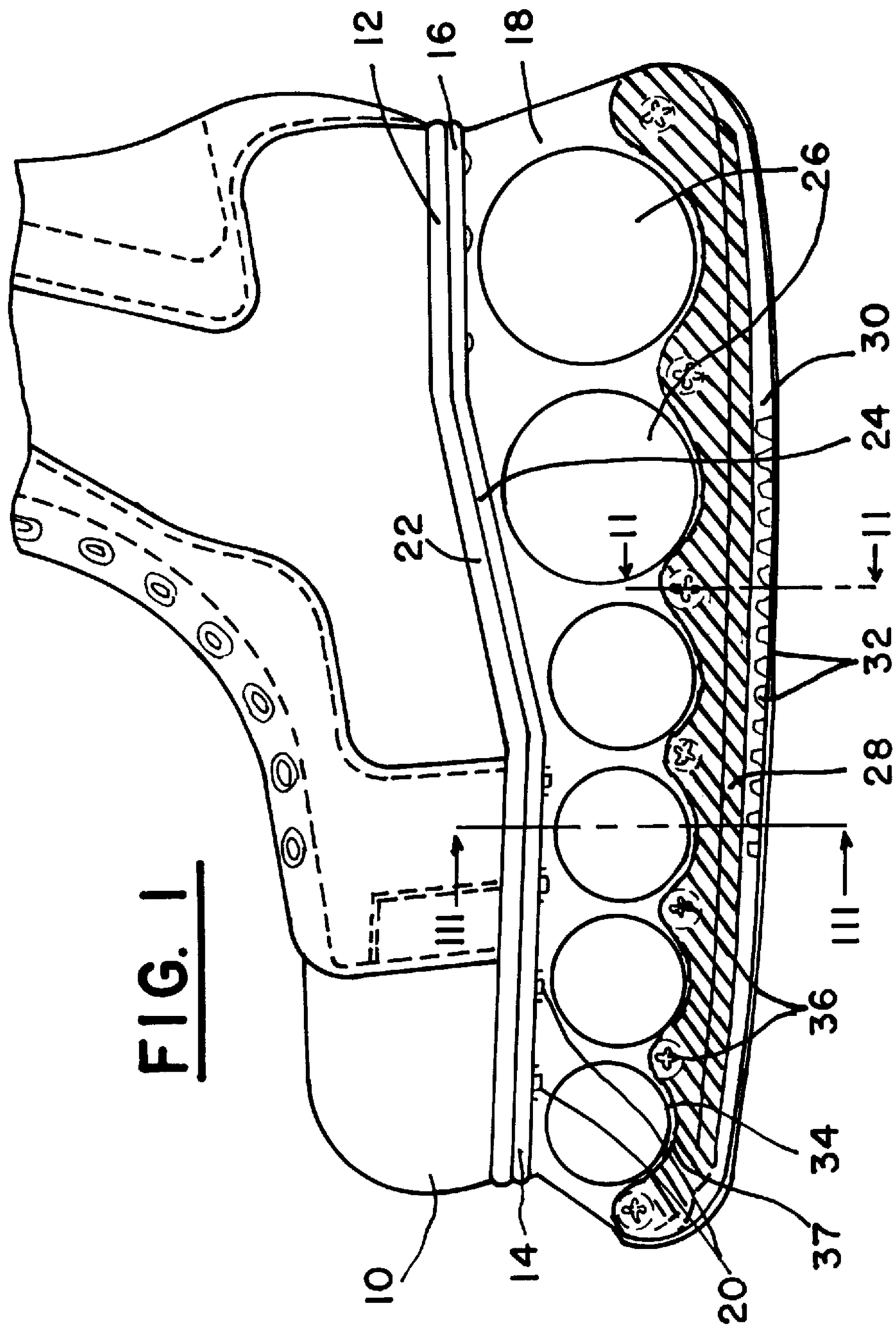


FIG. 1

FIG. 2

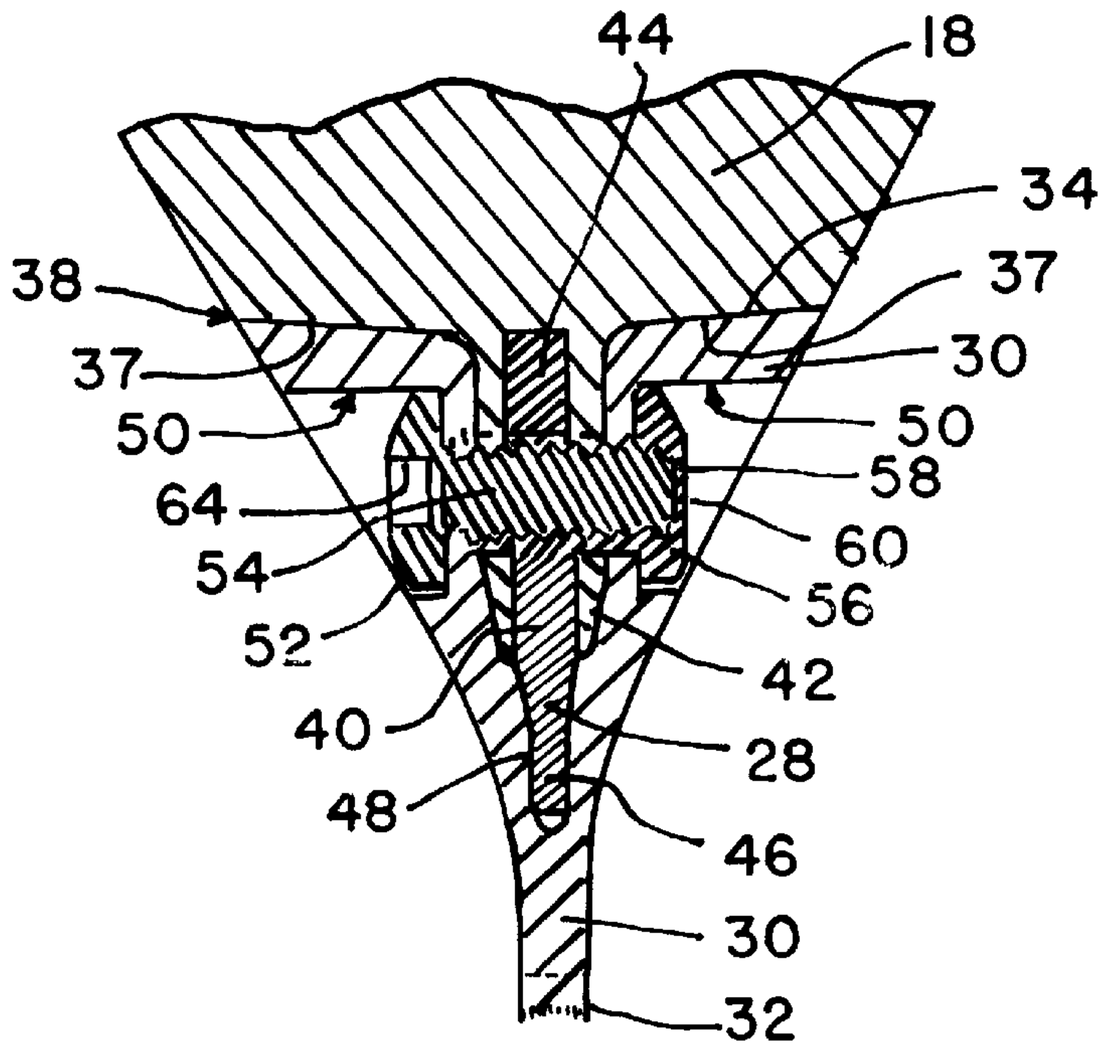

44
18
34
38
37
37
30
50
50
58
64
60
54
56
52
42
40
28
48
46
30
32

FIG. 3

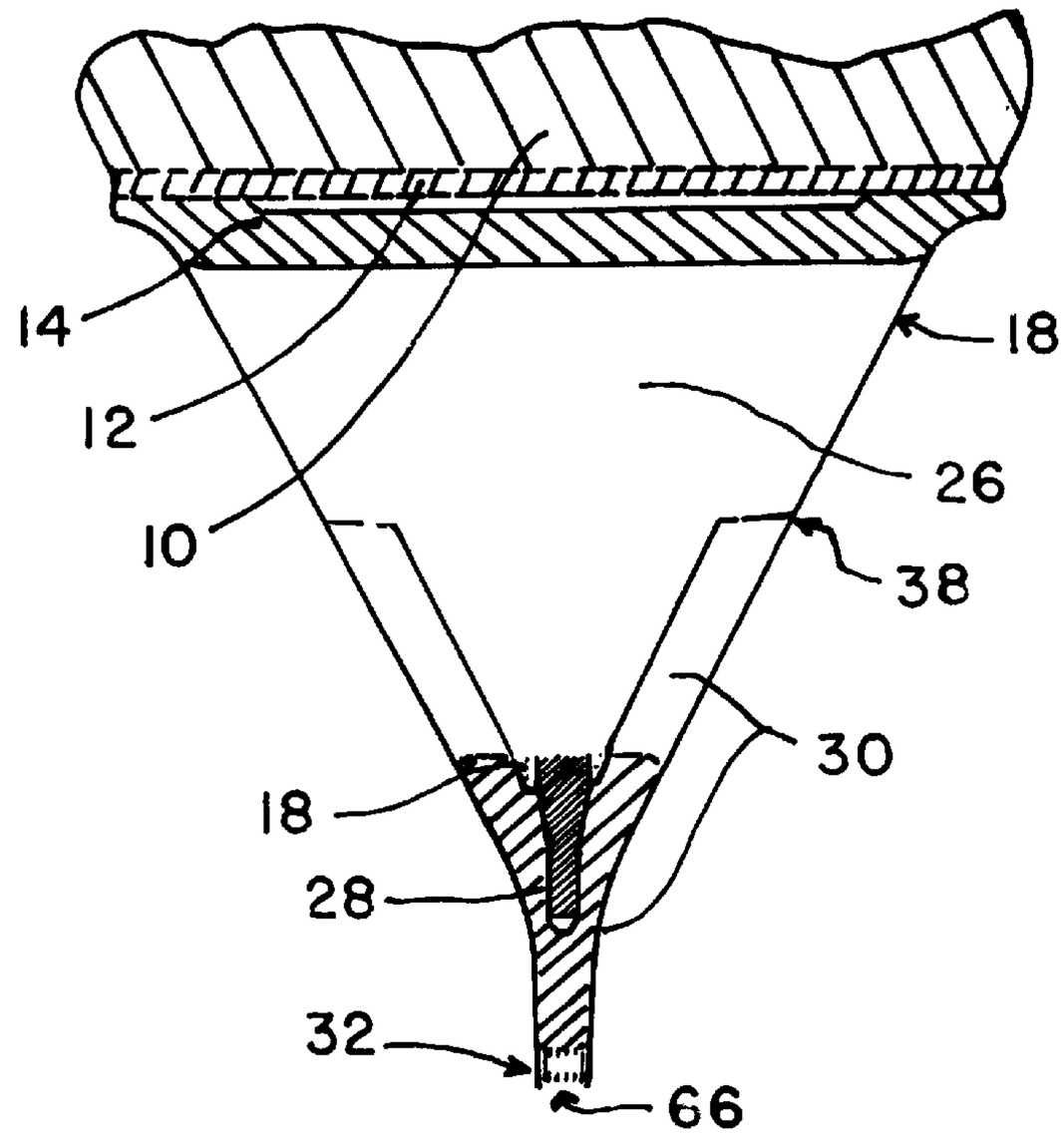

14
18
12
26
10
38
30
18
28
32
66

FIG. 4

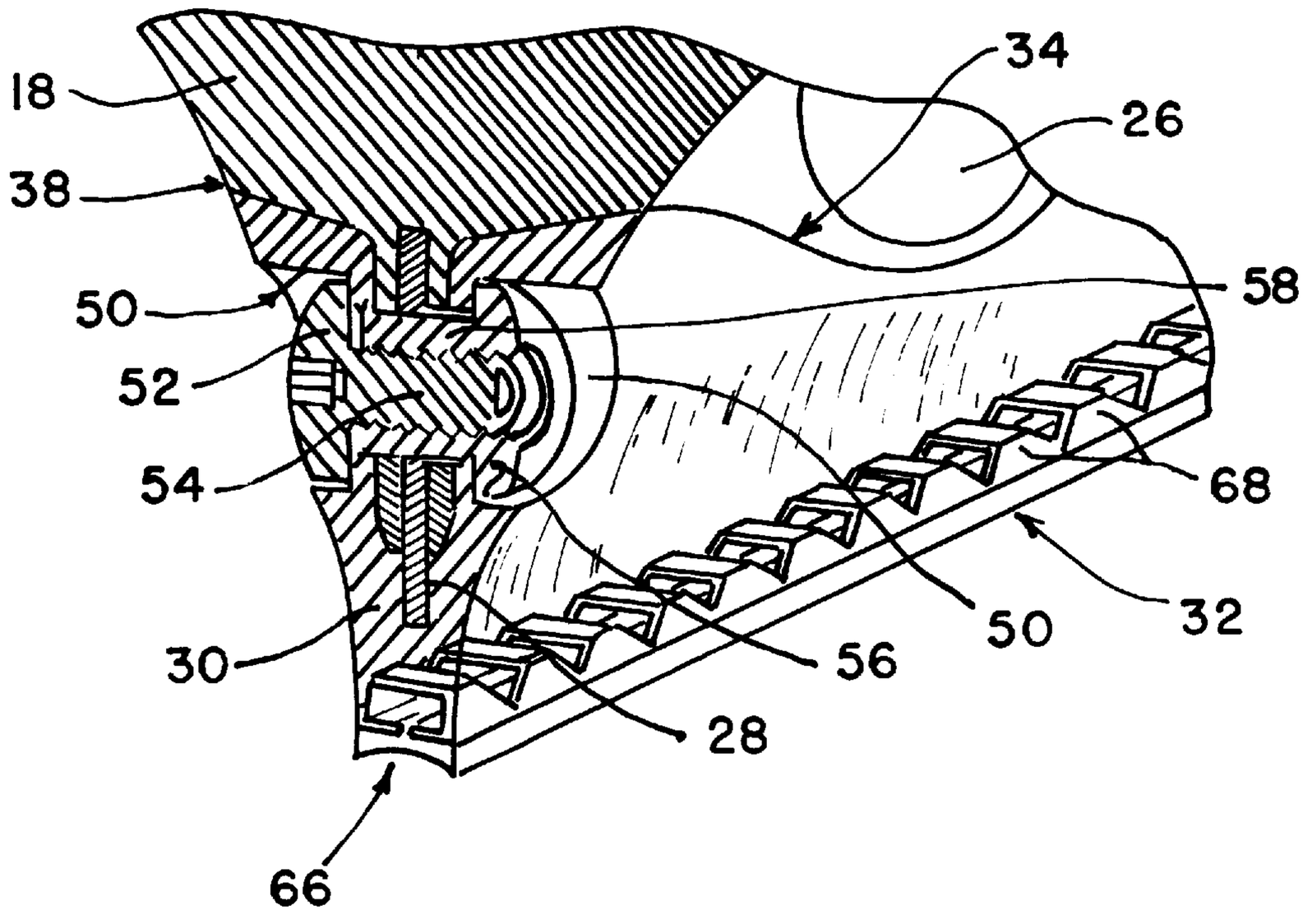
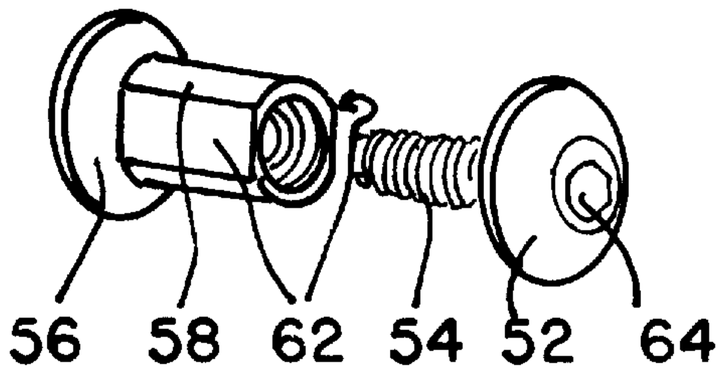


FIG. 5



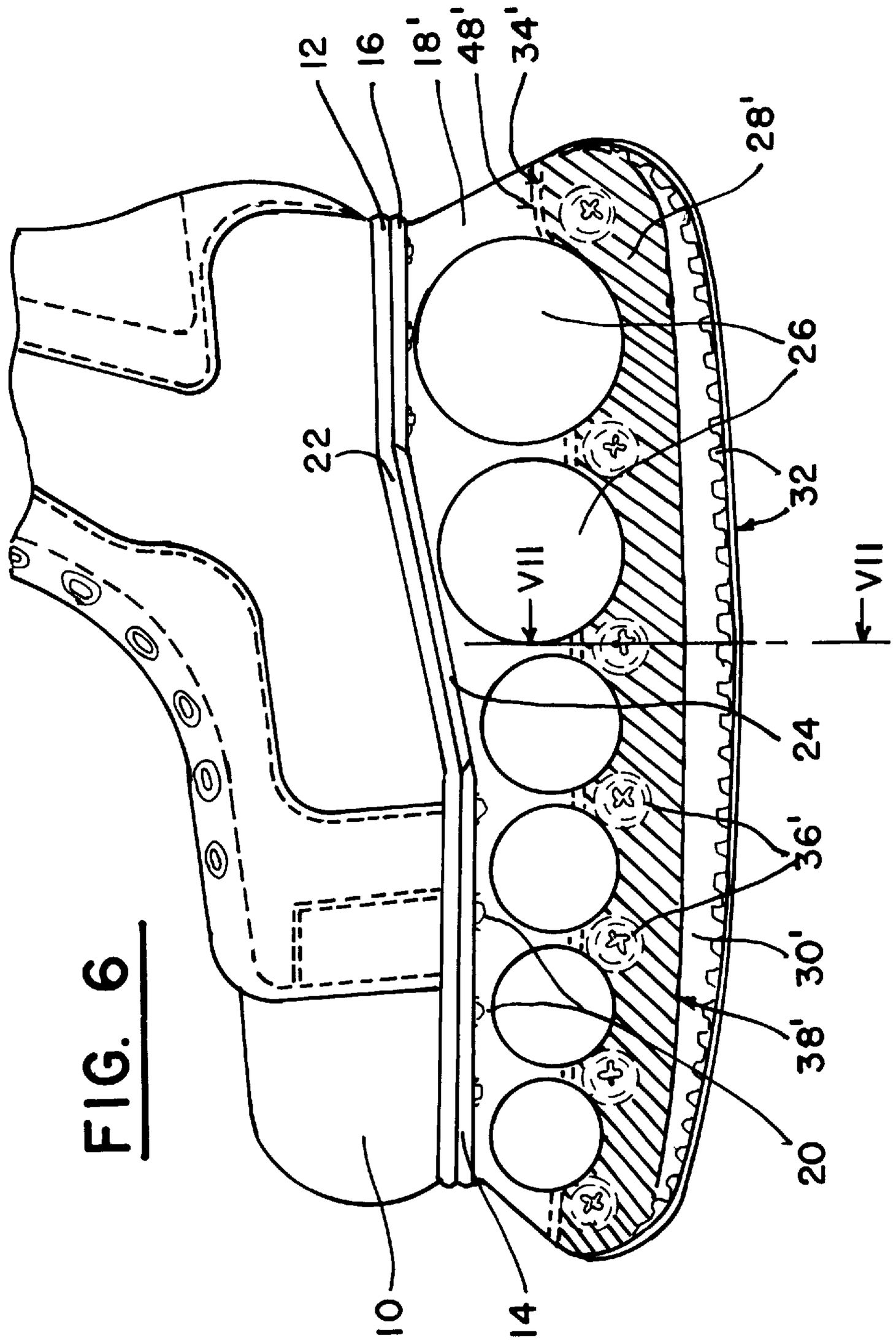


FIG. 6

FIG. 7

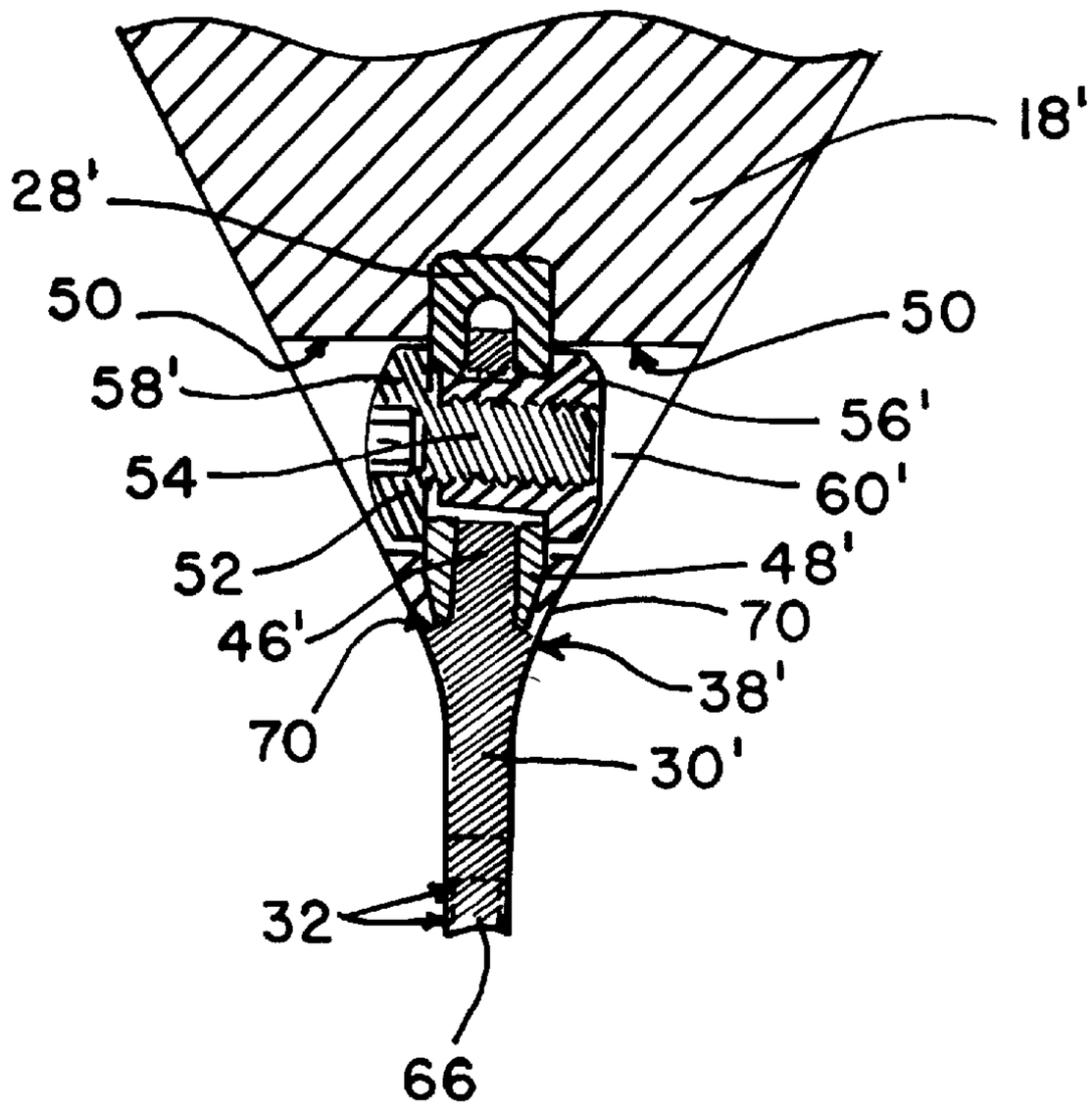

18'
28'
50
50
58'
56'
54
60'
52
48'
46'
70
70
38'
30'
32
66

FIG. 8

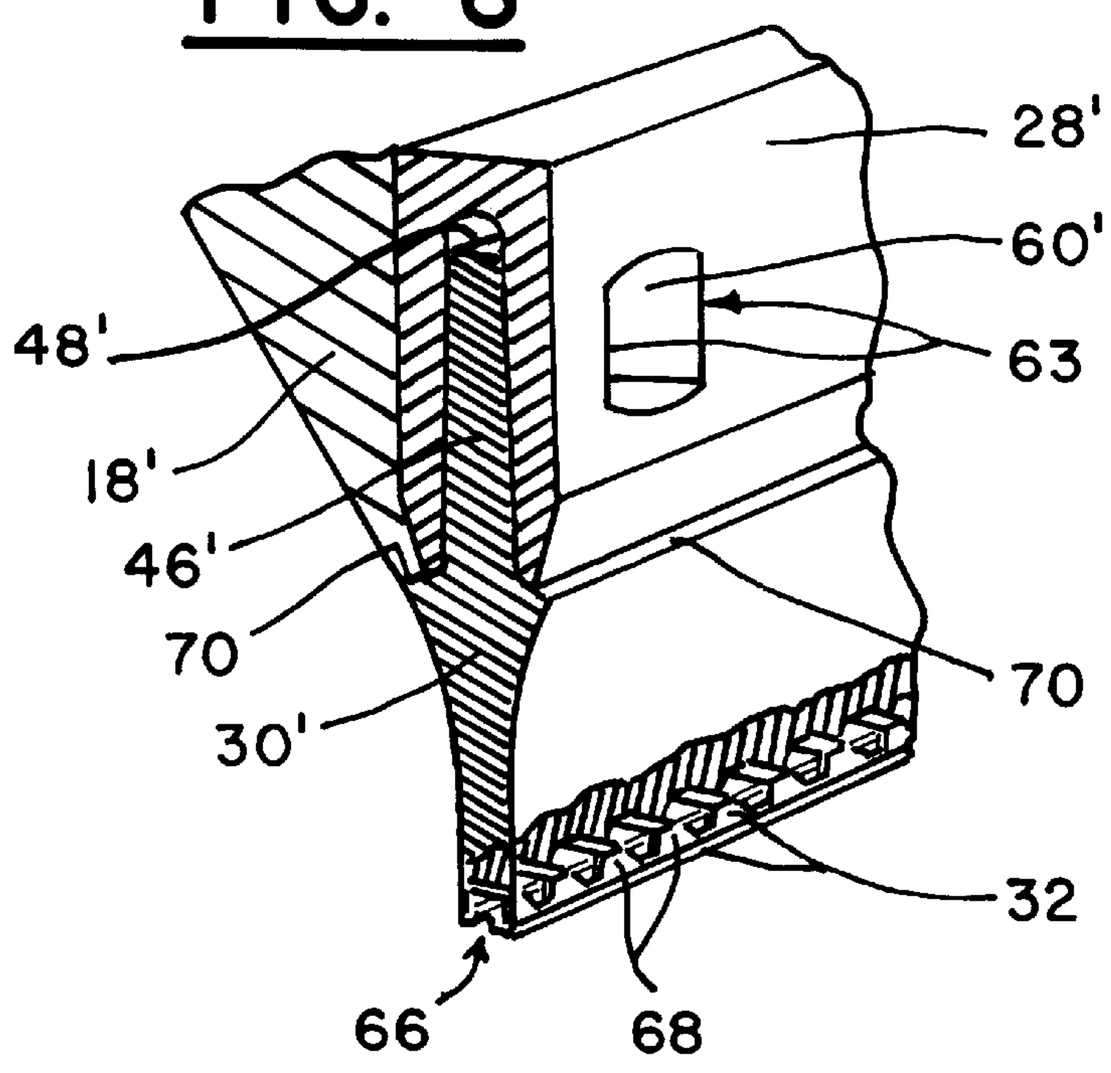

28'
60'
48'
63
18'
46'
70
70
30'
32
66
68

FIG. 9

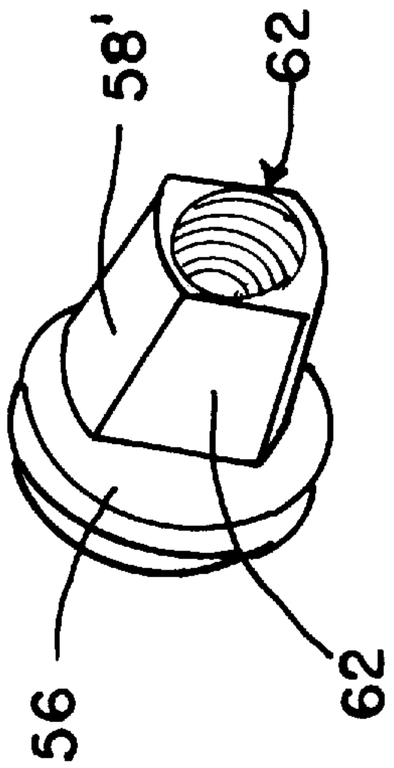


FIG. 10

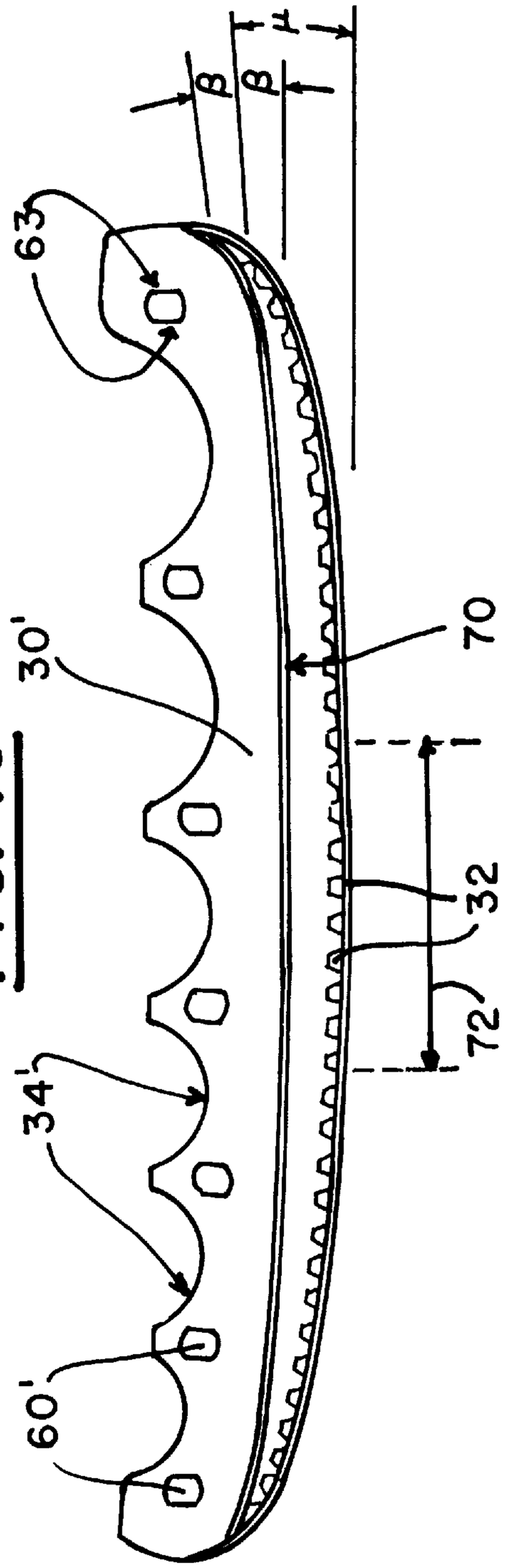


FIG. 11

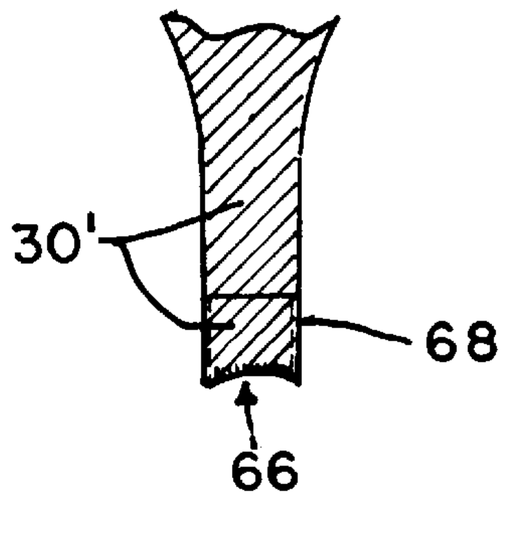


FIG. 12

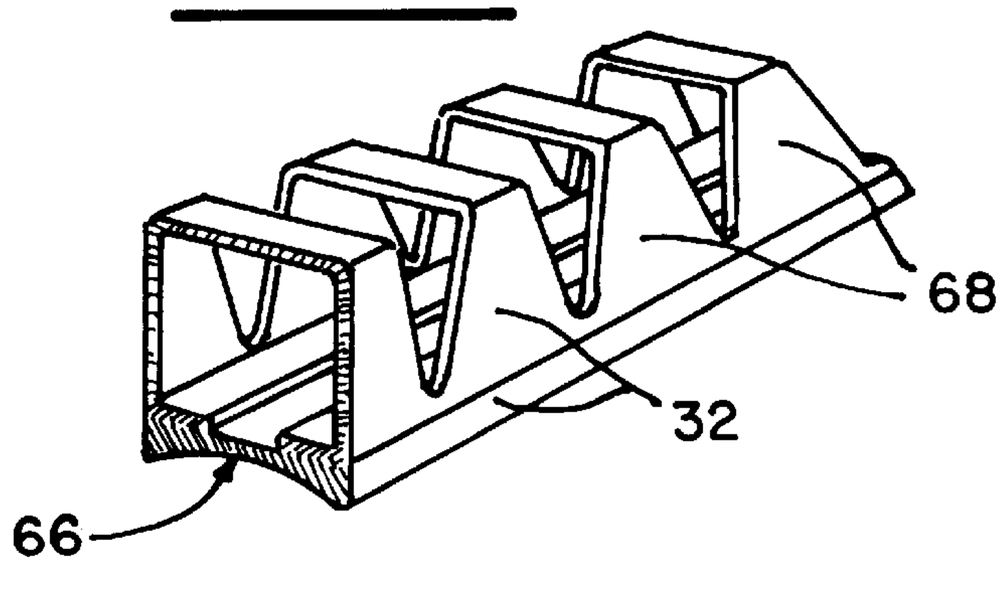


FIG. 13

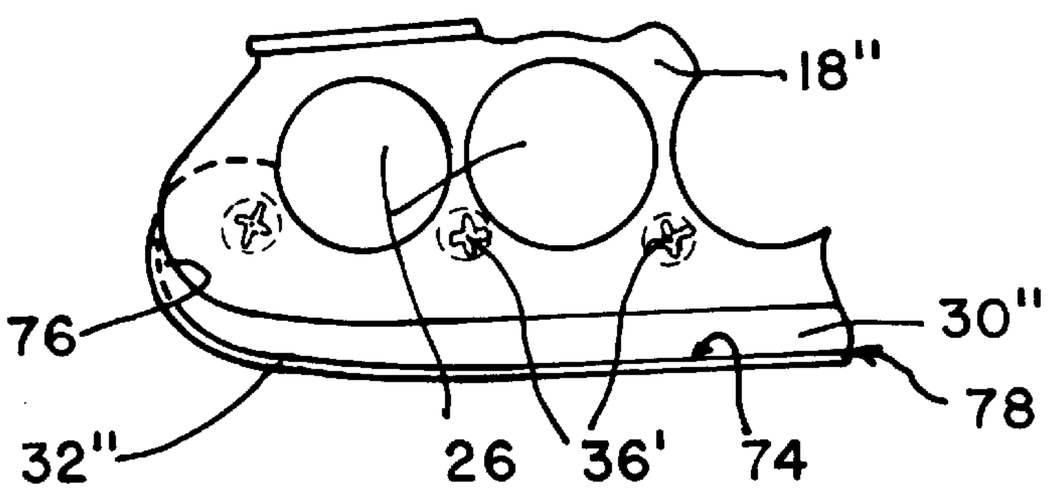


FIG. 14

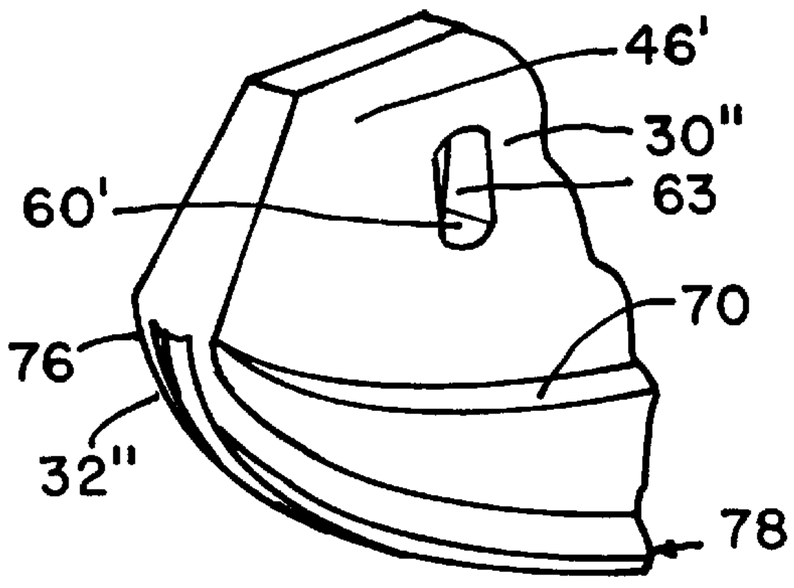
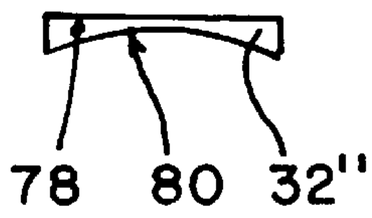


FIG. 15



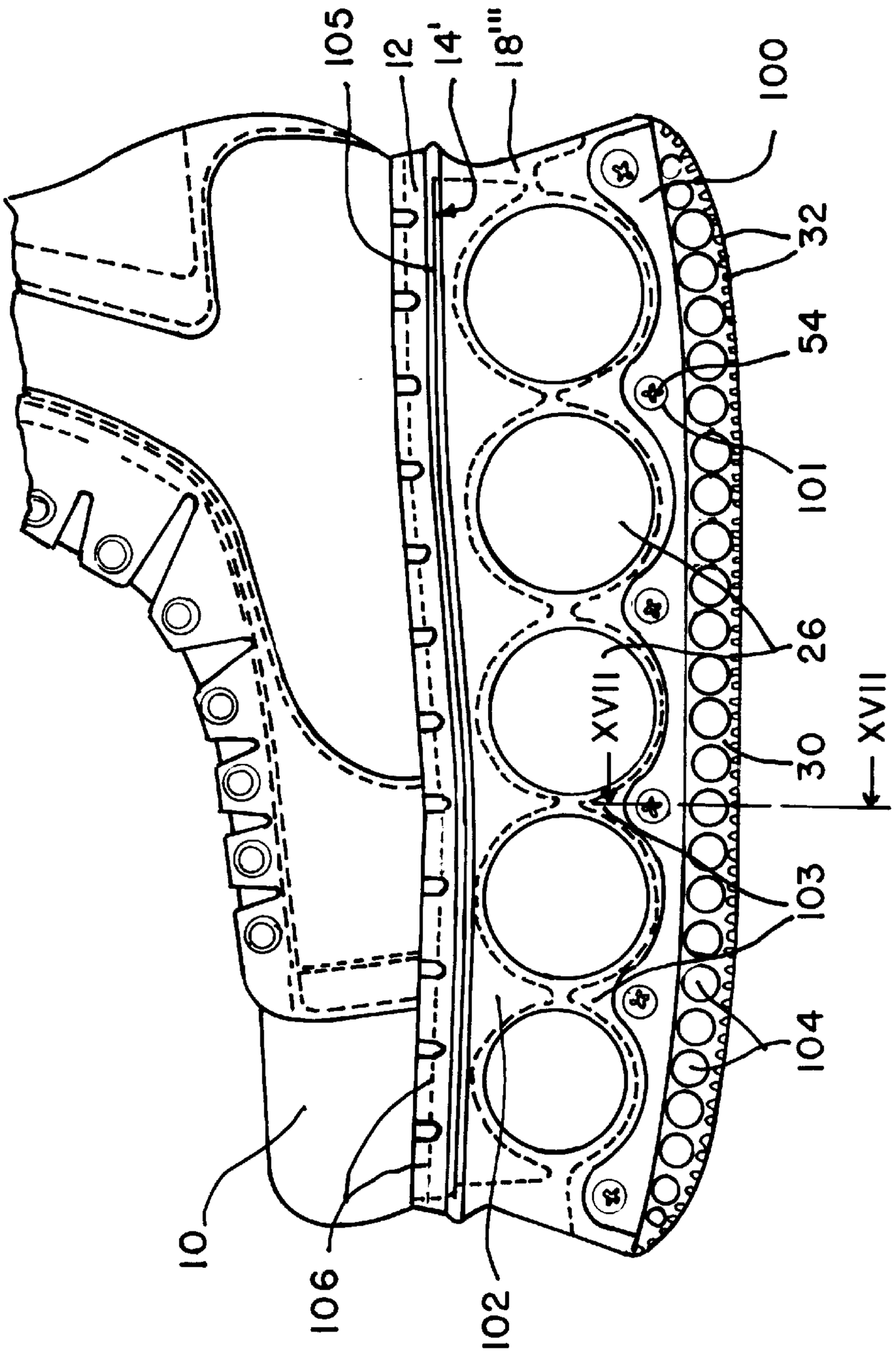


FIG. 16

FIG. 18

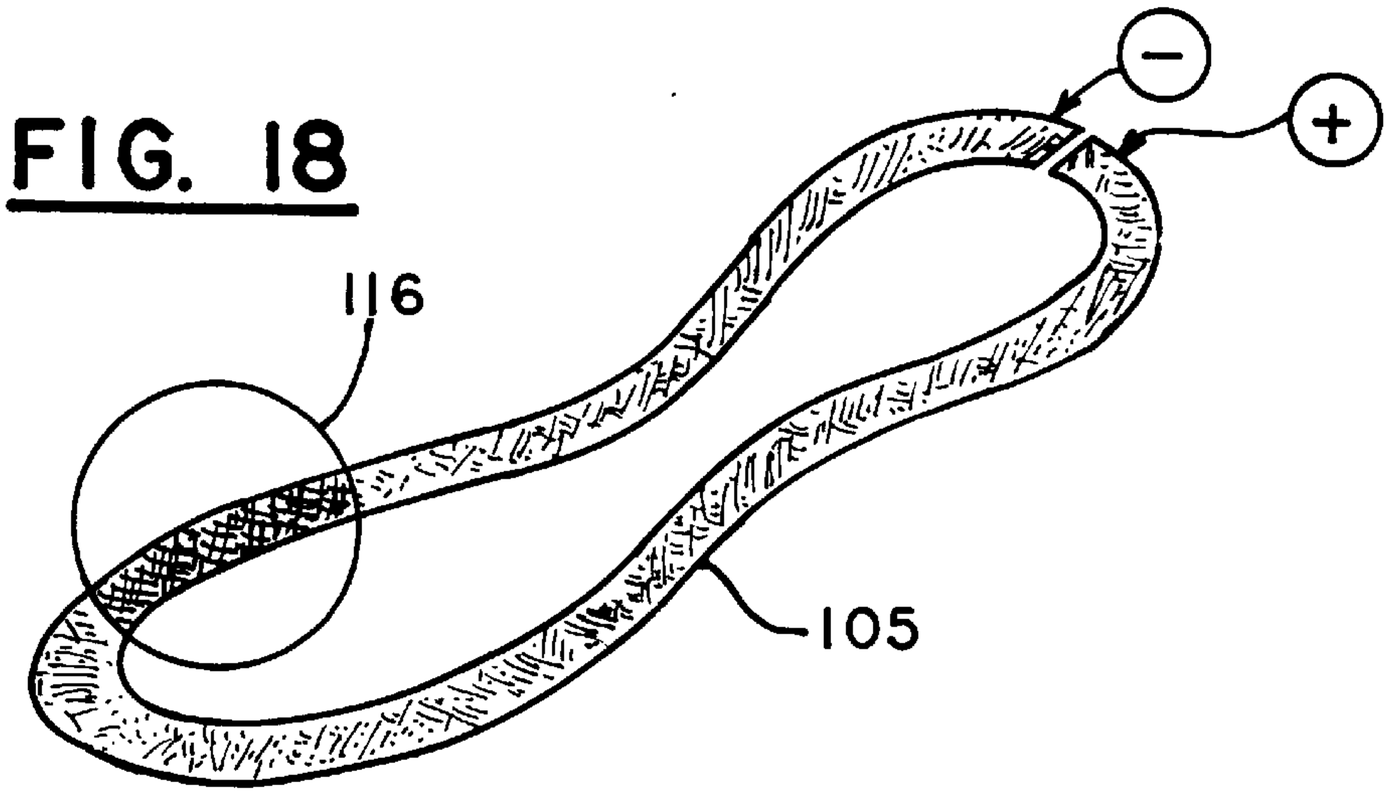

116
105
−
+

FIG. 17

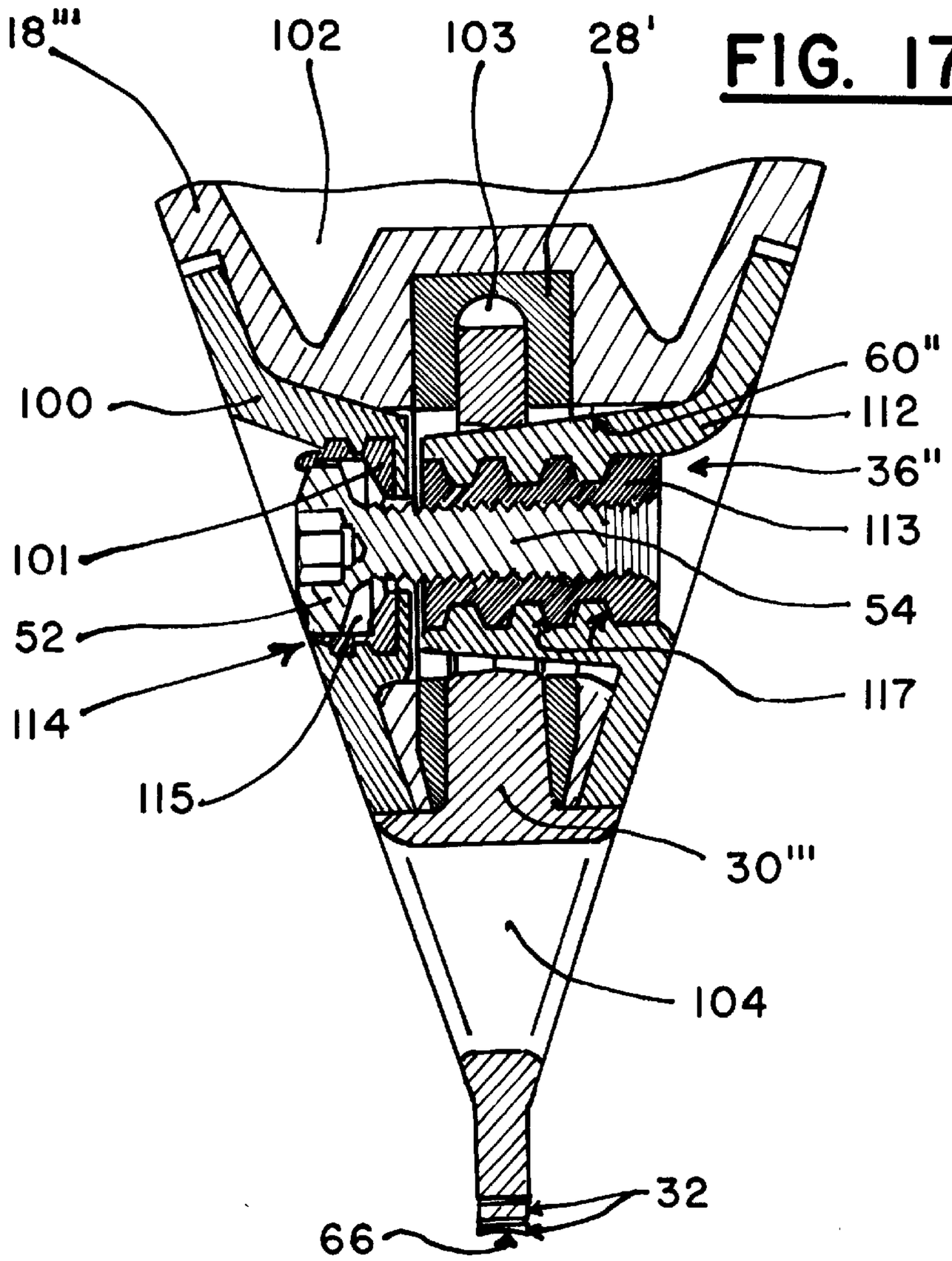
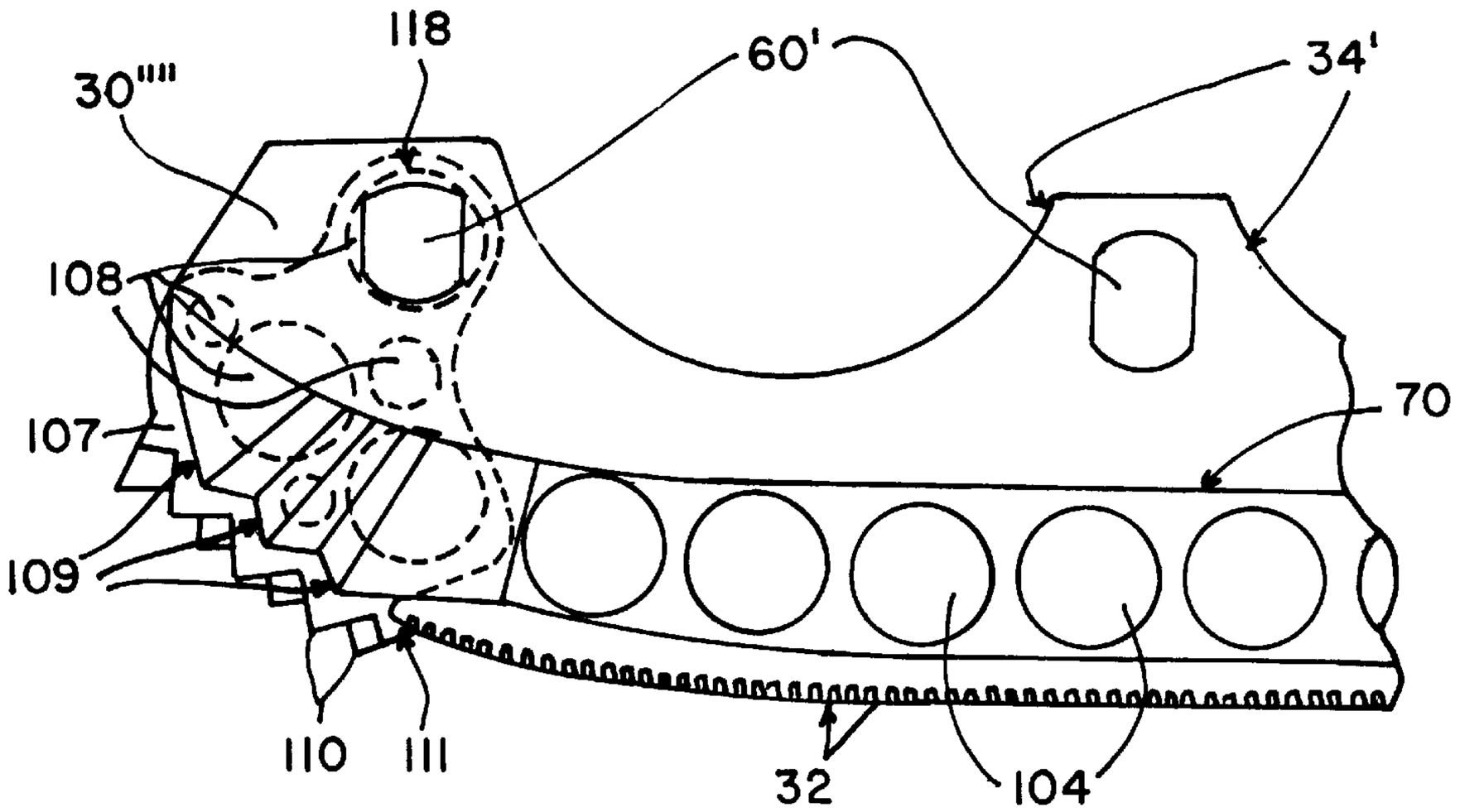

18'''
102
103
28'
60''
100
112
36''
101
113
54
52
117
114
115
30'''
104
32
66

FIG. 19


118
30''''
60'
34'
108
70
107
109
110
111
32
104

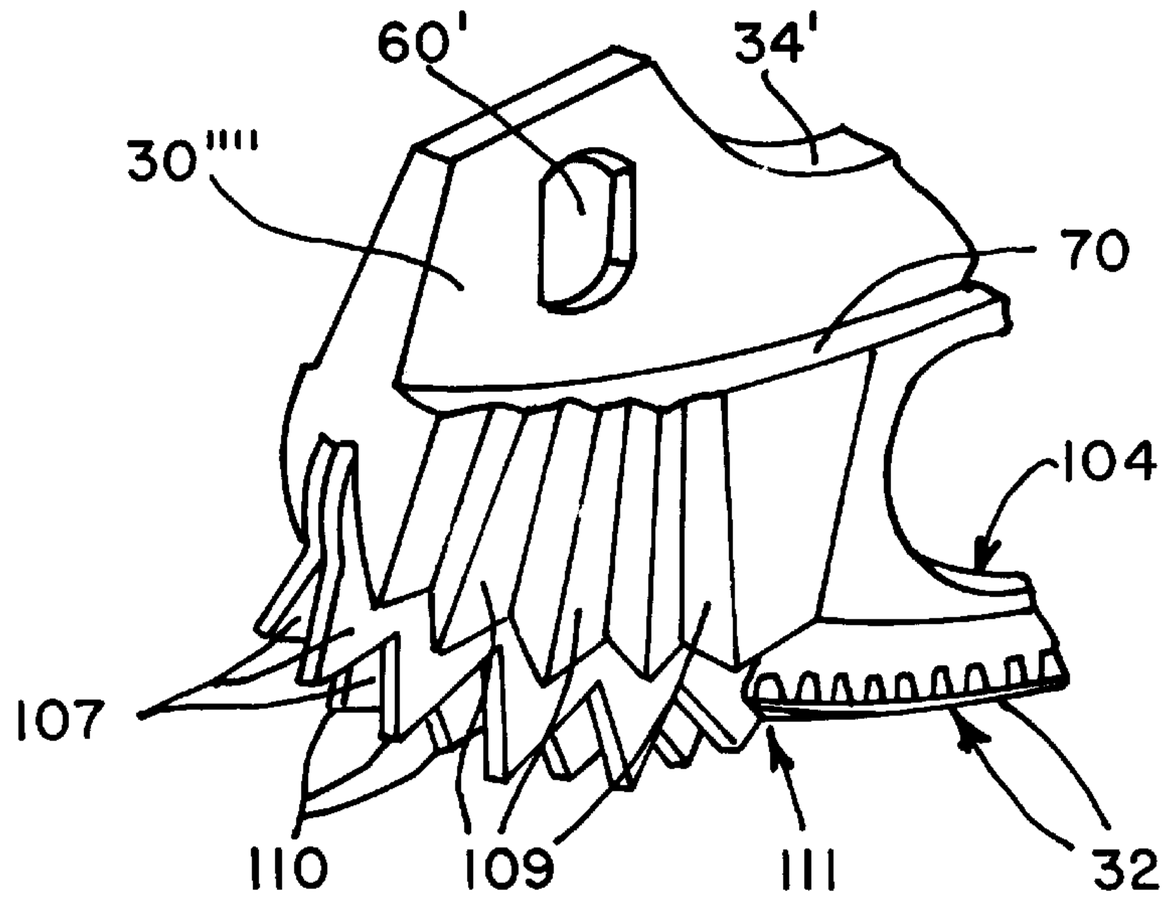

60'
34'
30''''
70
104
107
110
109
111
32

FIG. 20

SPORTS EQUIPMENT OR VEHICLES WITH RUNNERS WITH INTERCHANGEABLE BLADE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention pertains to sports equipment or vehicles with runners.

An ice skate with a basic unit attached to the sole of a boot and interchangeable runner blade attached of thereto is known from EP-427,920 A1. In this case the blade is clamped only at its front and rear ends by actuating a lever mechanism and is, moreover, sealed in shallow groove on the bottom of the basic unit consisting of plastic. It is not possible to achieve very substantial protection against warping and torsion of the parts joined together with this type of fastening.

The invention is intended to improve sports equipment or vehicles with runners in such a way that outstanding protection against warping and torsion is achieved at low overall weight and low manufacturing costs, with guaranteed exact fastening of the interchangeable and dimensionally precisely manufactured runner blade.

This problem is solved for sports equipment with runners.

Due to the stabilization rail and the nut-screw connections distributed over the entire length of the runner blade, which are very simple to install, outstanding bending strength and resistance to warping are achieved with a relatively light weight.

The subordinate claims pertain to advantageous refinements of the invention.

SUMMARY OF THE INVENTION

Thus, it is practical for the stabilization rail to be formed from a shaped rod.

The runner blade preferably consists of economical light metal or plastic and bears contact blade made of considerably more expensive resilient material. This allows the manufacturing costs for the interchangeable blades to be considerably reduced, as are the edge wear and risk of breakage of the blade.

Gripping ridges are seated on the contact blade and embedded in the material of the runner blade during injection molding to provide for a secure seating of the contact blade, which is subject to specific bending and shearing forces.

This feature makes possible an additional weight reduction of the runner while maintaining the high warping resistance and bending strength. The transverse cutouts and mounting devices therefore alternate over the entire length of the runner.

The upper rim of the stabilization rail surrounds the lower peripheral sections of the transverse cutouts in roughly a wave shape and in this way it optimally utilizes the fastening opportunities.

Either the stabilization rail can held in a vertical slit of the runner blade or the runner blade can be held in a vertical slit of the stabilization rail, with the insertion of the components inside one another further enhancing the stability of the arrangement.

Practical pertain to practical configurations of the retaining devices and the parts of the runner cooperating with them in order to achieve an easily assembled and secure fastening of the runner blade on the basic unit and the stabilization rail.

The basic unit may also be produced from economical and/or particularly light and warp-resistant material. The stabilization rail configured as a shaped rod consists preferably of light metal or carbon fiber material, such as Kevlar.

An even better anchoring of the basic unit to the sole of a skate boot is achieved by this arrangement.

Applicant's structure offers additional weight reduction of the basic unit and the runner blade.

Additional practical configurations of the mountain devices and the parts of the runner cooperating with them ease the mounting of a runner blade on the basic unit.

The runner blade is provided with a serrated steel blade arranged in the front area, which is particularly suited to figure skating and general recreational skating.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiment examples of the invention are explained the basis of the figures. These show in

FIG. **1** a schematic side view of a first embodiment of an ice skate boot according to the invention;

FIG. **2** a partial section along the line II—II in FIG. **1**;

FIG. **3** an enlarged partial section along the line III—III in FIG. **1**;

FIG. **4** a partial oblique view at roughly the position of the line II—II in FIG. **1**, in which the contact blade is drawn as if the material of the runner blade were transparent, for the sake of greater clarity;

FIG. **5** an exploded oblique view of a retaining device consisting of an extended nut and cap screw;

FIG. **6** a schematic side view corresponding to FIG. **1** of a second embodiment of an ice skate boot according to the invention;

FIG. **7** a partial section along the line VII—VII in FIG. **6**;

FIG. **8** a side view of the embodiment according to FIG. **6** corresponding roughly to FIG. **4**, with a part of the basic unit broken away for the sake of greater clarity;

FIG. **9** an oblique view of an extended nut and cap screw being used for the retaining devices in the embodiment example according to FIG. **6**;

FIG. **10** a schematic side view of the runner blade with contact blade used in the embodiment example according to FIG. **6**;

FIG. **11** an enlarged cutout from FIG. **7**;

FIG. **12** an enlarged cutout of part of a contact blade according to FIG. **8**;

FIG. **13** a partial side view of a part of a runner with adhered contact blade according to a third embodiment of the invention;

FIG. **14** an enlarged partial side view of the front end of the runner blade according to FIG. **13**;

FIG. **15** a cross section through the contact blade used in the embodiment example according to FIG. **13**;

FIG. **16** a schematic side view corresponding to FIG. **1** of a fourth embodiment of an ice skate boot according to the invention;

FIG. **17** a partial section along the line XVII—XVII in FIG. **16**;

FIG. **18** a schematic oblique view of a thermometallic lattice used in the embodiment according to FIG. **16**;

FIG. **19** a partial side view of the front end of a runner blade with serrated steel blade according to a fifth embodiment of the invention; and

FIG. **20** an oblique view of the front end of the runner blade used in the embodiment according to FIG. **19**.

The same reference numerals are used in all figure for identical or corresponding parts. The expressions "vertical," "horizontal," "above" and "below" refer only to the upright normal position of the various embodiment of an ice skate boot.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In the embodiments shown in FIGS. **1–5**, an ice skate boot **10** is provided with a continuous sole **12**. A flat sole plate **14** and a likewise flat heel attachment plate **16** of a slim base runner base unit **18** made of hard plastic or carbon fiber (Kevlar) are fastened to the sole in conventional manner by means of screws **20**. For angular compensation, the base unit **18** has, in the slanted middle section **22** of the sole **12**, a recess **24** rather than a plate in contact with the sole **12**. For additional weight reduction, the base unit **18**, slim and made of lightweight material in any case, has a series of tubular transverse cutouts **26** which run from its front to its rear end, spaced a slight distance apart, and occupy the greater part of its horizontal and vertical dimensions. A sufficiently stable framework remains between and around the transverse cutouts **26** of the base unit **18** in order to achieve the required bending strength and resistance to warping, as well as fracture resistance. The rigidity, but also a certain desired flexibility of the base unit **18**, can be determined and modified by changes of the wall thickness in certain parts of the base unit as well as by changing the shaping and material selection of the stabilization rail **28**, **28'**.

In a manner to be explained in more detail below, continuous, flat stabilization rail **28** made of light metal, running over essentially the entire length of the base unit **18**, and standing on edge, is injection-molded into the base unit; for greater clarity, it is shown cross-hatched in FIG. **1** in order to distinguish it from the other parts. The stabilization rail **28** is gripped on both sides by a runner blade **30**, which bears a contact blade **32** injected into the material of the runner blade and bent upwards at its front and rear ends in the usual manner. The upper rim **34** of the runner blade **30**, which roughly coincides in this embodiment with the upper edge of the stabilization rail **28**, as seen from the side, extends roughly in a wave shape and is adapted to the lower part of the contours of the transverse cutouts **26**, so that two wave crests of the upper edge **34** are arranged, respectively, on either side of each transverse cutout **26**. In the area of each wave crest there is a retaining device, generally labeled **36** and discussed in greater detail below, that serves to detachably fasten the runner blade **30** to the base unit **18**. The contact blade **32** can be designed as an extremely thin metal gliding surface with a thickness of, for instance, roughly 0.8 mm. When the contact blade **32** slides over ice, a rapid warming due to friction occurs in the area in contact with the runner blade **30**. Due to the heat-insulating effect of the plastic, of which the runner blade **30** preferably consists, the heat formed cannot flow away. While skating, this results in a clearly higher temperature of the contact blade **32**. The fast and lasting heating, in turn, influences water formation between the contact blade **32** and the ice, the sliding medium. The result is an effort-sparing and faster skating than with all known ice skating equipment.

The base unit **18**, the stabilization rail **28**, and the runner blade **30**, as well as the detachable fastening of the latter, are illustrated in greater detail in FIGS. **2–5**. The upper edge **34** of the runner blade **30** together with the correspondingly shaped lower edge of the recesses **37** on both sides of the base unit **18** forms a continuous connection joint **38**, along which the two components make close contact. In the middle of the cross section (see FIG. **2**) the runner blade **30** has an essentially vertical slot **40** opening upward, in which a projection **42** of the base unit **18** makes a flush engagement. An upper section **44** of the stabilization rail **28** is securely injected [sic embedded by injection molding] or glued into the projection **42**. A lower section **46** of the stabilization rail **28** sticking out from the projection **42** is tightly inserted into a thinned-out lower section **48** of the slit **40**, so that, together with the butt joint **38**, a flawless seating of the runner blade **30** on the base unit **18** is guaranteed. The outer surfaces of the parts **18** and **30** adjoin flushly and smoothly at the butt joint **38**.

In the area of the wave crests of the upper edge **34**, the runner blade has a recess **50** on both sides for accommodating the head **52** of a cap screw **54** or the head **56** of an extended nut **58**, so that the latter do not project above the surface of the runner blade **30**. The clap screw **54** and the extended nut **58** together constitute a retaining device **36** for fastening the runner blade **30** to the base unit **18** and, in the assembled state shown in FIGS. **2** and **4**, pass through a transverse opening **60** of the runner blade **30** and the stabilization rail **28**, as well as the projection **42** of the base unit **18**, running from one recess **50** to the opposite recess **50**. The extension of the extended nut **58** has two opposing antirotation surfaces **62**, which make close contact with corresponding antirotation surfaces **63** of the transverse opening **60**. In this way, the extended nut **58** is automatically held in place against rotation during insertion of the cap screw **54**. To make the insertion of the cap screw **54** easy, its head **52** has an internal polygonal socket **64**. This construction of the retaining device **36** makes possible an easy and simultaneously secure attachment of the runner blade **30** to the base unit and the same kind of detachment when wear of the contact blade **32** makes exchange of the runner blade **30** necessary. The cooperation of the retaining devices **36** with the stop surfaces and stabilization measures provided results in an extraordinarily stable, bending- and torsion-resistant seating of the runner blade **30** on the base unit **18**.

The contact blade, labeled **32** as a whole, has a band-shaped part **66** of metal as a gripping part welded to it, which has gripping ridges **68** that are preferably embedded in the material of the runner blade **30** by injection molding. The gripping ridges **68** are boxes open in the axial direction of the contact blade **32** with trapezoidal side faces, by means of which the material of the runner blade **30** can penetrate into the gripping ridges **68**, and the latter are connected to the runner blade **30** in an extraordinarily stable manner. In FIG. **4**, the lowest part of the runner blade **30** is broken away in order to make the gripping ridges **68** more clearly discernible.

The resilient basic metal of part **66** of the contact blade preferably has a hardness of 700 HV, and may in addition be surface-coated with, for instance, a TiCN coating having a hardness of 3000 HV. This results in extremely low edge wear and a service life of the runner blade **30** that is increased by a factor of 4–5.

The second embodiment of an ice skate boot according to the invention, as illustrated in FIGS. **6–12**, essentially differs from the embodiment of FIGS. **1–4** by the differing configuration and fastening of the runner blade **30'** and the cooperating fastening parts. Only these differing parts and relationships are discussed below.

In this embodiment the stabilization rail **28'** embedded in the base unit **18'** has a vertical slot, **48'** open and expanding

in a downward wedge. A flat ridge **46'** of the runner blade **30'** that tapers upward correspondingly is inserted into the slot **48'**. Along a butt joint **38'**, the runner blade **30'** makes contact with the lower edge of stabilization rail **28'** and base unit **18'** by means of shoulders **70** projecting outward on both sides.

The transverse opening **60'** and the extension **58'** of the extended nut **58'** having the head **56'** are formed conically in this embodiment in the same direction and same manner, so that when tightening the cap screw **54** in the extended nut **58'**, the wedge-shaped ridge **46'** is drawn into the wedge-shaped slot **48'** of the stabilization rail **28'** with increasing strength and simultaneously the shoulders **70** of the runner blade **30'** make close contact with the lower edges of the stabilization rail **28'** and the base unit **18'**. This makes it possible to achieve a particularly stable connection between the runner blade **30'** and the base unit **18'**.

The remaining components of this embodiment have essentially the same configuration and mode of operation as the corresponding parts in the embodiment according to FIGS. **1–4** and need not therefore be discussed again. Only the flattening of the wave crests provided on the wave-shaped upper edge **34'** of the runner blade **30'** need be mentioned.

However, it should be pointed out in particular, that based on FIG. **10**, by the appropriate shaping of the interchangeable runner blade **30** or **30'** the so-called contact surface length **37** [sic] can be freely selected and the so-called contact angle α can be increased or decreased by the angle β. Moreover, the gliding radius of part **66** can be adjusted according to the nature and hardness of the gliding medium, that is, the ice surface, by increasing or reducing the optimal skating conditions. Depending on the application purpose, different interchangeable blades can therefore be kept on hand and exchanged appropriately, for which only a series of screw connections need be loosened and then retightened in order to achieve an absolutely firm as well as bending- and torsion-resistant seating of the runner blade. The two heads **52** and **56** or **56'** here are equipped on the inside with large flat head surfaces in order to draw the runner blade **30** or **30'** against the base unit **18** or **18'** with high contact pressure. It is practical that the extended nut **58** or **58'** consist of light metal or a strong plastic.

The configuration and anchoring of the gripping ridges **68** are illustrated once again in FIGS. **11** and **12**. Of course, other forms of the gripping ridges are possible in principle, with the only points to be observed being the good penetration of the injection molded mass that constitutes the runner blade **30** or **30'** into the shapes of the gripping ridges, and sufficient strength of the latter. The connection of the component having the gripping ridges **68** to the resilient component **66** of the contact blade can preferably be accomplished by laser welding.

FIGS. **13–15** illustrate a third embodiment of the skate runner according to the invention, in which the contact blade **32"** is not fastened to the underside **74** of the runner blade **30"** by gripping ridges, but rather by adhesion to it. At each end of the contact blade **32"**, which is bent upwards, the runner blade **30"** has a recess **76** to prevent the two ends of the contact blade **32"** from sticking out. The adhesion along the adhesion surface **78** is preferably accomplished with an insoluble plastic or metal adhesive in an appropriate gluing device.

The skating radius **80** can generally be chosen as desired in all embodiments.

In the embodiment according to FIGS. **16–18**, an upturned sole rim **106** from the base unit **18'"** surrounds the sole **12** of the ice skate boot **10** and is preferably welded to the sole **12** by means of thermal welding or the like. A strip-like metal grid insert **105**, illustrated in FIG. **18**, is placed between the sole **12** and sole plate **14'** of the base unit **18'"**. After joining the ice skate boot **10** and the base unit **18'"**, the metal grid insert **105** can be thermally welded together with sole **12** and sole plate **14'**. This thermal welding can be done together with the welding of the sole rim **106**. The metal grid insert **105** preferably consists of a fine-mesh thin metal grid, as indicated by **116** in FIG. **18**. It can be produced from a copper alloy punched out into a flat band roughly 10 mm wide and laid out in the outline shape of a sole. The two ends + and – are separated and for welding can be connected to the corresponding terminals of an electric power source.

In order to reduce the weight of the base unit **18'"** further, cavities **102** are recessed into its upper side and are connected to or open into the transverse cutouts **26** of the base unit **18'"**, which also serve to reduce the weight.

The weight of the runner blade **30'"** can also be reduced by placing a series of tubular transverse cutouts **104** in it.

The assembly of the retaining devices **36"** can be made simpler for the embodiment according to FIGS. **16** and **18** by virtue of the fact that a cap screw **54** inserted into a nut **113** is used as the retaining device, with cap screw **54** and nut **113** passing through the transverse opening **60"** but not making contact with its walls. Instead, the head **52** of each cap screw **54** is seated in the cavity **115** of a bushing **101** and is prevented from falling out of it by a crimped edge **114**, but is able to rotate inside the cavity **115**. The bushing **101** is provided with undercuts and the like and is in turn injection-molded into a screw-fitting strip **100** that runs along one side surface of the base unit **18'"** from the frontmost to the rearmost retaining device **36"**. The screw-fitting strip **100** is recessed into the side of the base unit **18'"** such that, including the screw heads **52**, it lies flush in the side of the base unit **18'"**. In this way, the cap screws **54** of all retaining devices **36** of a runner are securely held inside the screw-fitting strip **100**, making assembly much easier.

In a similar manner, the nuts **113** of all retaining devices **36"** on the opposite side of the base unit **18'** are injection-molded into a single nut-fitting-strip **112**, likewise consisting of plastic, and recessed into the side of the base unit **18'** such that, including the nuts, it lies flush in the side of the base unit **18'"**. For better anchoring in the nut-fitting strip **112**, the nuts **114** [sic **113**] have radial channels **117** as well as a polygonal cross section, for instance a hexagonal cross section.

The embodiment of a runner blade **30""** shown in FIGS. **19** and **20** has a serrated steel blade **107** that is injection-molded or glued into the front area. The serrated steel blade **107** has teeth **110** projecting downward and frontward. This embodiment is particularly suited for figure skating and general recreational skating.

It is practical that the front part **111** of the contact blade **32** overlap the serrated steel blade **107** so as to provide a better anchoring of the latter in the runner blade **30""**. An additional improvement of the anchoring of the serrated steel blade **107** in the runner blade **30""** can be achieved by surrounding the frontmost transverse opening **60'** for inserting a retaining device **36'** with an anchoring yoke **118** formed as a single piece with the serrated steel blade **107**, so that anchoring pressure is also exerted on the serrated steel blade **107** by tightening the retaining device **36'**. Moreover, several cutouts **108** of the serrated steel blade **107** also serve for injection and hence, anchoring of the serrated steel blade

107 in the material of the runner blade 30"". A practical lateral support of the serrated steel blade 107 from both sides can be accomplished since the runner blade=30"" has support teeth 109 that extend over the serrated steel blade 107 and project into the middle area of the teeth 110 and are integrally molded piece with runner blade

I claim:

1. A runner, said runner comprising:

a base unit having a top side and a bottom side and an interchangeable runner blade fastened to said bottom side of said base unit,

said runner blade including a contact blade on a bottom side of said runner blade, said contact blade having gripping ridges embedded into said runner blade,

a stabilization rail integral with the lower side of the base unit, said stabilization rail having an upper edge and a lower edge, said runner blade being in contact with the stabilization rail and

wherein a plurality of transverse openings pass through said stabilization rail and said runner blade, respectively, into each of which is inserted a retaining means for holding together the stabilization rail and the runner blade, and said base unit has a series of tubular transverse cutouts for weight reduction, with one transverse opening arranged for the retaining means arranged on each side of each transverse cutout.

2. A runner according to claim 1, wherein said upper edge of the stabilization rail and the upper edge of the runner blade run roughly axially in a wave shape and are adapted to the outlines of the transverse cutout.

3. A runner according to claim 1, wherein each retaining means includes an extended nut, said extended nut having a collar, seated flush in the respective transverse opening and a cap screw, with the heads of said cap screw and extended nut each countersunk into recesses in the outer surface of the runner blade and the base unit and with antirotation surfaces, which cooperate with corresponding surfaces of the transverse opening being provided on the collar of the extended nut.

4. A runner according to claim 3, wherein said transverse opening and the outer surface of the collar of each extended nut are conical.

5. A runner according to claim 11, wherein said runner blade makes contact with lower edges of the base unit and the stabilization rail respectively, by means of shoulders projecting upward.

6. A runner according to claim 1, wherein for additional weight reduction, upwardly opening cavities are recessed into the upper side of the base unit and are connected to the transverse cutouts.

7. A runner according to claim 1, wherein each retaining means includes a cap screw passing through the transverse opening and screwed into a nut, with the cap screws of said retaining means being housed on a single screw-fitting strip that is recessed into the side of the base unit such that, including the heads of cap screws, it lies flush with the side of the base unit and the nuts are held in place inside the transverse openings.

8. A runner according to claim 7, wherein said head of each cap screw is seated so that it is able to rotate in a cavity of a bushing made of light weight metal and equipped at its outer end with a crimped edge, with the bushing being seated so that it is incapable of rotation in the screw-fitting strip.

9. A runner according to claim 8, wherein said screw-fitting strip consists of plastic and the bushing is injected into the screw-fitting strip.

10. A runner according to claim 7, wherein all nuts are held in place in a single nut-fitting strip, which is inserted into a recess of the base unit such that, including the nuts, it lies flush with the side of the base unit.

11. A runner according to claim 10, wherein said nut-fitting strip consists of plastic and the nuts consisting of light weight metal are injection molded into the nut-fitting strip.

12. A runner according to claim 11, wherein said nuts have radial channels and a polygonal cross section.

13. A runner according to claim 1 wherein said gripping ridges are in the form of boxes open in a longitudinal direction of the contact blade and having trapezoidal side faces.

14. A runner comprising:

a base unit having a top side and a bottom side and an interchangeable runner blade fastened to said bottom side of said base unit,

said runner blade including a contact blade on a bottom side of said runner blade, said contact blade having gripping ridges embedded into said runner blade, and

a stabilization rail integral with the lower side of the base unit, said stabilization rail having an upper edge and a lower edge and wherein said runner blade has a continuous, essentially vertical slot, into which the lower edge of the stabilization rail is inserted.

15. A runner comprising:

a base unit having a top side and a bottom side and an interchangeable runner blade fastened to said bottom side of said base unit,

said runner blade including a contact blade on a bottom side of said runner blade, said contact blade having gripping ridges embedded into said runner blade, and

a stabilization rail integral with the lower side of the base unit, said stabilization rail having an upper edge and a lower edge and wherein said stabilization rail has a continuous, essentially vertical slot tapering upwards in the form of a wedge, into which is inserted a likewise upward-tapered flat ridge of the runner blade.

16. A runner comprising:

a base unit having a top side and a bottom side and an interchangeable runner blade fastened to said bottom side of said base unit,

said runner blade including a contact blade on a bottom side of said runner blade, said contact blade having gripping ridges embedded into said runner blade, and

wherein said base unit has a sole rim surrounding the sole of an ice skate boot, said boot is welded to said sole.

17. A runner according to claim 16, wherein a thermally welded grip insert welded together with sole and sole plate is placed between the sole of the ice skate boot and the sole plate of the base unit.

18. A runner comprising:

a base unit having a top side and a bottom side and an interchangeable runner blade fastened to said bottom side of said base unit,

said runner blade including a contact blade on a bottom side of said runner blade, said contact blade having gripping ridges embedded into said runner blade,

a serrated steel blade with teeth projecting downward and forward is fastened to the forward part of the runner blade, and

wherein said runner blade has support teeth that extend over the serrated steel blade and project into the middle area of the teeth of said serrated steel blade.

19. A runner comprising:

a base unit having a top side and a bottom side and an interchangeable runner blade fastened to said bottom side of said base unit,

said runner blade including a contact blade on a bottom side of said runner blade, said contact blade having gripping ridges embedded into said runner blade, and

a stabilization rail integral with said bottom side of said base unit, a plurality of transverse openings each passing through said stabilization rail and said running blade are provided, and fastening means extending through said transverse openings to hold together said stabilization rail and said running blade.

20. A runner comprising:

a base unit having a top side and a bottom side and an interchangeable runner blade fastened to said bottom side of said base unit,

said runner blade including a contact blade on a bottom side of said runner blade, said contact blade having gripping ridges embedded into said runner blade, and

wherein said runner blade consists of a lightweight heat insulating material and said contact blade is formed of an extremely thin layer and constitutes the gliding surface of the runner, whereby when the contact blade glides over ice it warms rapidly due to friction and due to the insulating effect of the runner blade the heat in the contact blade does not flow into the runner blade.

21. A runner comprising:

a base unit;

an interchangeable runner blade formed of a light weight material and fastened to said base unit; and

a contact blade formed of a hard-resilient material integral to a bottom side of said runner blade, said contact blade having gripping ridges in the form of boxes open in a longitudinal direction of the contact blade and having trapezoidal side faces, said gripping ridges being embedded into the material of said runner blade and penetrated by the material of said runner blade.

22. A runner comprising:

a base unit;

a stabilization rail integral with a lower side of the base unit, said stabilization rail having a slot tapering upwards in the form of a wedge;

a runner blade formed of a light weight material and having a tapered ridge on a top side, said tapered ridge being inserted into said vertical slot of said stabilization rail; and

a contact blade formed of a hard resilient material integral to a bottom side of said runner blade, said contact blade having gripping ridges embedded into the material of said runner blade.

23. A runner comprising:

a base unit;

a stabilization rail integral with a lower side of the base unit with a plurality of transverse openings passing therethrough, said stabilization rail having a slot tapering upwards in the form of a wedge;

a runner blade formed of a light weight material with a plurality of transverse openings passing therethrough and having a tapered ridge on a top side, said tapered ridge being inserted into said vertical slot of said stabilization rail whereby said transverse openings in said stabilization rail align with said transverse openings in said runner blade;

a plurality of retaining means for fastening together the stabilization rail and the runner blade, each of said plurality of retaining means extending through one of said transverse openings in said runner blade and one of said transverse openings in said stabilization rail; and

a contact blade formed of a hard resilient material integral to a bottom side of said runner blade, said contact blade having gripping ridges embedded into the material of said runner blade.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 5,769,434
DATED : June 23, 1998
INVENTOR(S) : Holger Wurthner

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Claim 5, line 1, replace "11" with --4--.

Signed and Sealed this

Twenty-second Day of September, 1998

Attest:

BRUCE LEHMAN

Attesting Officer

Commissioner of Patents and Trademarks